method, and surface irregularity **23***a* in a range from 10 nm to 20 μm in period and in a range from 10 nm to 10 μm in height was observed depending on the growing conditions. Then the second layer was grown from GaN so as to fill in the surface irregularity **23***a*, thereby to obtain the epitaxial substrate **20**.

[**0157**] The epitaxial substrate **20** showed RMS surface roughness of the epitaxial substrate **10**, density of threading dislocations and density of stacking faults of similar values as those of the epitaxial substrate **10** in Examples 1 through 4. The light emitting diode **6**, the laser diode **7** and the field effect transistor **8** were made similarly to Examples III through VI, respectively. Thus the semiconductor devices having characteristics similar to those of Example III through VI were obtained.

Example XI

[**0158**] Now examples of the third embodiments will be described while making reference to **FIG. 10**. A light emitting device structure **40** was epitaxially grown. As a growing method, the MOVPE method was used. As a semiconductor growing substrate **35**, the sapphire substrate that the off-angle α inclining toward the (0001) plane was set to −0.5° was used. The AlN layer **41** (200 nm), the GaN layer **42** (2 μm), the n-type cladding layer **43** (500 nm), the GaN/GaInN active layer **44** (30 nm) having multiple quantum well structure, the p-type $Al_{0.2}Ga_{0.8}N$ layer **45** (2 nm), the p-type $Al_{0.07}Ga_{0.93}N$ cladding layer **46** (3 nm) and the p+ type GaN layer **47** (3 nm) were formed successively on the sapphire substrate, thereby to make the light emitting device structure **40**. The n-type layers were doped with silicon, and the p-type layers were doped with magnesium. Every layer that constitutes the light emitting device structure was not larger than 3 μm in thickness, making it suitable for volume production.

[**0159**] Growing temperatures of the layers were set so as not to affect the characteristics of the epitaxial substrate such as composition, crystallinity, surface roughness and electric properties.

[**0160**] Through measurement by X-ray diffraction, it was confirmed that the light emitting device structure **40** was oriented in [01-12] direction.

[**0161**] A light emitting device **50** as shown in **FIG. 16** was produced. A mask was formed by photolithography, and dry etching was carried out using chloride gas. Depth of etching was controlled so that etching would be stopped amid the n-type cladding layer **43**.

[**0162**] A p-side ohmic electrode **51** was formed by deposition of Ni/Au to thickness of 20/80 nm, and an n-side ohmic electrode **52** was formed by deposition of Ti/Al/Ti to thickness of 30/100/20 nm, thereby to obtain the light emitting device **50**.

[**0163**] The light emitting device **50** was a blue light emitting device having peak wavelength of 450 nm, and showed higher luminance than in the case of orienting the light emitting device structure similar to that described above in [0001] direction.

Examples XII-1 Through 6, Comparative Examples XII-1 and 2

[**0164**] Examples XII-1 through 6, Comparative Examples XII-1 and 2 were made similarly to Example XI while varying the conditions as shown in Table 4, and were evaluated.

[**0165**] The off-angle β was fixed at 0° and the off-angle α was changed as in Comparative Examples XII-1 and 2. In case the sapphire substrate **35** having the principal plane in (01-12) plane of a being −0.2° and β being −0.8°, the light emitting device structure **4** showed larger surface roughness.

[**0166**] In Examples XII-1 through 3, surface roughness was kept small when the off-angle α was in the range of $-0.75° \leqq \alpha \leqq -0.25°$.

[**0167**] In case the off-angle α was fixed at −0.5° and the off-angle β was changed as in Examples XII-4 through 6, surface roughness was kept small when |β| was less than 0.5°.

TABLE 4

	Off-angle α deg	Off-angle |β| deg	Surface roughness nm
Example XII-1	−0.5	0	5
Example XII-2	−0.3	0	6
Example XII-3	−0.7	0	6
Example XII-4	−0.5	0.06	15
Example XII-5	−0.5	0.04	8
Example XII-6	−0.5	0.02	7
Comparative Example XII-1	−0.2	0	20
Comparative Example XII-2	−0.8	0	20

1. A sapphire substrate of which principal plane for growing nitride semiconductor is inclined from (01-12) plane toward (0001) plane by an off-angle α that is in a range of $0°<\alpha<5°$.

2. An epitaxial substrate for manufacturing a field effect transistor that has heterojunction structure comprising at least a channel layer of gallium nitride or gallium indium nitride and a barrier layer of aluminum gallium nitride, that are formed successively on the principal plane of the sapphire substrate,

wherein the principal plane of said sapphire substrate is inclined from (01 12) plane toward (0001) plane by an off-angle α that is in a range of $0°<\alpha<5°$.

3. The epitaxial substrate according to claim 2, wherein a base layer of aluminum gallium nitride AlxGa1-xN of which molar ratio x of aluminum nitride is in a range of $0.5<x<1.0$ is grown directly on said sapphire substrate.

4. The epitaxial substrate according to claim 3, wherein the thickness of said base layer is in a range from 0.05 to 2.0 μm.

5. A semiconductor device that uses the epitaxial substrate according to claim 2 or 3.

6. An epitaxial substrate comprising a sapphire substrate having the principal plane in the (01-12) plane and at least a first layer and a second layer that are made of nitride semiconductors of different compositions formed in this order on the substrate, wherein